

CLAIMS

What is claimed is:

1. An electrode device comprising:
 - a first electrode having an upper region wider than a lower region; and
 - a second electrode disposed on top of said upper region of said first electrode.
2. The device of claim 1, wherein said electrode device further comprises a plurality of electrical connections.
3. The device of claim 1, wherein said upper region upwardly slopes from said lower region.
4. The device of claim 1, wherein said first electrode comprises a first conductive material, and said second electrode comprises a second conductive material.
5. The device of claim 4, wherein said first and second conductive material are electrically conductive.
6. The device of claim 4, wherein said first conductive material further comprises photoactive compounds, wherein said photoactive compounds comprise one of polyphenylenevinylene, polypyrrole, and polythiophene derivatives.

1 7. The device of claim 4, wherein said second conductive material comprises one of
2 aluminum, copper, titanium, titanium nitride, sputtered tungsten, tantalum, and tantalum nitride.

1 8. An electrode device comprising:
2 a first electrode having an upper region wider than a lower region;
3 a second electrode disposed on top of said upper region of said first electrode; and
4 a plurality of electrical connections;
5 wherein said upper region upwardly slopes from said lower region;
6 wherein said first electrode comprises a first conductive material, and said second
7 electrode comprises a second conductive material;
8 wherein said first and second conductive material are electrically conductive.

1 9. The device of claim 8, wherein said first conductive material further comprises photoactive
2 compounds, wherein said photoactive compounds comprise one of polyphenylenevinylene,
3 polypyrrole, and polythiophene derivatives.

1 10. The device of claim 8, wherein said second conductive material comprises one of
2 aluminum, copper, titanium, titanium nitride, sputtered tungsten, tantalum, and tantalum nitride.

1 11. A method of forming an electrode device, said method comprising:
2 depositing a first conductive material on a substrate;
3 patterning a mask on top of said first conductive material;

4 forming properly dimensioned and configured spaced regions on top of said substrate;
5 removing said mask from said first conductive material;
6 expanding said first conductive material such that an upper region of said first conductive
7 material upwardly slopes from a lower region of said first conductive material;
8 depositing a second conductive material on top of said first conductive material;
9 depositing said second conductive material on said spaced regions on said substrate.

1 12. The method of claim 11, wherein said mask is patterned on said first conductive material
2 by adding photoactive materials to said conductive material and directly patterning said
3 conductive material by lithography.

4 13. The method of claim 11, wherein said mask is patterned on said first conductive material
5 by lithography and etching, wherein said lithography comprises the steps of:

6 coating a photoactive organic polymer over said first conductive material;
7 exposing and developing selected regions of said first conductive material to create a
8 patterned masked photoresist;
9 performing a dry or wet etch to pattern said first conductive material;
removing said mask by dry or wet processing; and
applying a predetermined low-temperature annealing process to said first conductive
material.

1 14. The method of claim 11, wherein said first and second conductive material are electrically
2 conductive.

1 15. The method of claim 14, wherein said first conductive material further comprises
2 photoactive compounds, wherein said photoactive compounds comprise one of
3 polyphenylenevinylene, polypyrrole, and polythiophene derivatives.

1 16. The method of claim 14, wherein said second conductive material comprises one of
2 aluminum, copper, titanium, titanium nitride, sputtered tungsten, tantalum, and tantalum nitride.

1 17. The method of claim 11, wherein said patterning of said mask is accomplished by using
2 one of a laser photoablation, a photosensitive conducting polymer, electrochemical
3 polymerization, and direct nanoimprint.